3D CONGRESS, 2d Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 803.

WEYMOUTH FORE RIVER, MASS.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS ON PRELIMINARY EXAMINATION AND SURVEY OF WEYMOUTH FORE RIVER, MASS., WITH A VIEW TO A MODIFICATION OF THE PROJECT.

FEBRUARY 28, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

WAR DEPARTMENT,
Washington, February 27, 1914.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Acting Chief of Engineers, United States Army, dated 26th instant, together with copies of reports from Col. F. V. Abbot and Col. John Millis, Corps of Engineers, dated May 1, 1913, and January 26, 1914, with map, on preliminary examination and survey, respectively, of Weymouth Fore River, Mass., made in compliance with the provisions of the river and harbor act approved March 4, 1913.

Very respectfully,

LINDLEY M. GARRISON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 26, 1914.

From: The Chief of Engineers, United States Army.
To: The Secretary of War.
Subject: Preliminary examination and survey of Weymouth Fore River, Mass.

1. There are submitted herewith, for transmission to Congress, report dated May 1, 1913, by Col. Frederic V. Abbot, Corps of Engineers,

and report dated January 26, 1914, with map, by Col. John Millis Corps of Engineers, on preliminary examination and survey, respectively, of Weymouth Fore River, Mass., with a view to a modification of the project, authorized by the river and harbor act approved March 4, 1913.

2. Weymouth Fore River is a tidal estuary tributary to Hingham Bay on the south side of Boston Harbor. The project for its improvement adopted by the act of March 3, 1905, provided for a channel 18 feet deep at mean low water and 300 feet wide up to the bridge at Quincy Point. The existing project adopted by the act of February 27, 1911, is to widen and straighten this channel, including the removal of Channel Rock, all at an estimated cost of $140,000. This work has been completed at a cost considerably less than the estimate, leaving an unexpended balance of about $60,000. Col. Millis submits estimates of cost of widening the 18-foot channel to 400 feet, amounting to $21,000, and of deepening the channel to 20, 21, 22, and 24 feet with a width of 400 feet, amounting to $154,000, $202,000, $265,000, and $390,000, respectively. He states that there are no general commercial interests of consequence involved, other than those of the Fore River Shipbuilding Corporation, and in his opinion the proposed improvement would not be justified by the outside interests which are amply served by the existing channel. He expresses no opinion regarding the advisability of the United States undertaking additional improvement in aid of this corporation. Col. Abbot, who submitted the report on preliminary examination and passes on the survey report as division engineer, is not in favor of increasing the project depth, but he recommends the widening of the 18-foot channel to the lines shown on accompanying map, approximating 400 feet, at an estimated cost of $21,000, provided Congress approves the use of that sum from the unexpended balance of the appropriation made for completing the existing project.

3. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated February 10, 1914, concurring with the views of the division engineer.

4. After due consideration of the above-mentioned reports, I concur with the views of the division engineer and the Board of Engineers for Rivers and Harbors, and therefore report that the further improvement by the United States of Weymouth Fore River, Mass., is deemed advisable to the extent of widening the 18-foot channel below the bridge at Quincy Point to the lines shown on accompanying map, approximating 400 feet, at an estimated cost of $21,000. It is recommended that authority be given for the expenditure of this amount from the funds now on hand to the credit of the existing project.

EDW. BURR,
Colonel, Corps of Engineers,
Acting Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON SURVEY.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
February 10, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. These are reports on preliminary examination and survey, respectively, of Weymouth Fore River, Mass., with a view to a modification of the project. Weymouth Fore River is a tidal tributary of Hingham Bay, on the south side of Boston Harbor. The distance from the Quincy Point Bridge to deep water in Hingham Bay is about 3½ miles. The rise and fall of the tide ranges from 7.6 to 10.3 feet, the average being about 9.5 feet, which affords, with the 18-foot project, a high water navigable depth of 27.5 feet.

2. The act of March 3, 1905, adopted a project for a channel 18 feet deep and 300 feet wide up to the bridge at Quincy Point, at an estimated cost of $57,500, and the act of February 27, 1911, adopted the existing project, which involves widening and straightening the channel and removing some rock ledge, at an estimated cost of $140,000, which amount was made available by that act. Owing to very favorable conditions explained by the district officer, the project has been completed at a cost considerably less than that estimated, leaving an unexpended balance of about $60,000.

3. The commerce of the locality has been quite uniform for several years past, averaging about 170,000 tons, the principal article being coal, which amounts to about 145,000 tons.

4. A survey has been made to determine the extent and advisability of additional improvement, and estimates are given for channels of varying depths, the width in each case being 400 feet, in round numbers, as follows:

Channel 24 feet deep at mean low water	$390,000
Channel 22 feet deep at mean low water	265,000
Channel 21 feet deep at mean low water	202,000
Channel 20 feet deep at mean low water	154,000
Increasing width of present 18-foot channel to 400 feet	21,000

No estimate is given for work above the bridge, as it is expected local interests will do whatever is necessary there. The existing channel depths are sufficient for the present general freight traffic, and the increased depth desired is of importance at this time only to the Fore River Shipbuilding Corporation, located just above the Quincy Point Bridge.

5. The district officer making the preliminary examination (now the division engineer), reports the locality worthy of further improvement. The district officer making the survey is of opinion that the proposed improvement would not be justified by the general interests of commerce, as these are adequately served by the present project. The interests of the Fore River Shipbuilding Corporation are very large and important, but they are not those of general commerce, and the district officer expresses no opinion as to the advisability of the United States undertaking additional improvement in aid of that corporation. The division engineer is not in favor of increasing the project depth, but he recommends the widening of the

existing 18-foot channel to the lines shown on accompanying map approximately 400 feet, at an estimated cost of $21,000, provided Congress approves the use of that sum from the unexpended balance of the appropriation already provided.

6. From the report of survey it will be seen that any increase in depth would be expensive by reason of the existence of rock ledge. It seems clear from the facts presented that present facilities are sufficient to meet the ordinary demands of commerce and navigation and that the only interests seriously concerned in further improvement are those of the Fore River Shipbuilding Corporation, which is engaged in the construction of large vessels, including battleships for the United States. The largest of this class of vessels tax the capacity of the present channel both in width and depth, and any additional work would be solely for their safe handling.

7. The board believes that the public benefits that would result from the proposed increase of 100 feet in the width of the channel are sufficient to warrant the comparatively small expenditure required for that purpose, but it does not consider the conditions such as to warrant the much larger expenditure required to give any material increase in depth. The board therefore concurs in the views expressed by the division engineer that it is advisable for the United States to modify the existing project so as to increase the width to 400 feet at an estimated cost of $21,000, authority to be given for the expenditure of this sum from the funds now in hand credited to the existing project.

8. In compliance with law the board reports that there are no questions of terminal facilities, water power, or other subjects so related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

W. M. Black,
Colonel, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION OF WEYMOUTH FORE RIVER, MASS

United States Engineer Office,
Boston, Mass., May 1, 1913.

From: The District Engineer Officer.
To: The Chief of Engineers, United States Army
(Through the Division Engineer).
Subject: Preliminary examination of Weymouth Fore River, Mass

1. In compliance with instructions contained in letter, dated March 18, 1913, and with provisions of the river and harbor act approved March 4, 1913, the following report is submitted on the preliminary examination of Weymouth Fore River, Mass., with a view to a modification of the project.

2. *Work already done.*—The river and harbor act approved August 11, 1888, contained an item providing for a preliminary examination and survey of Weymouth Fore River, Mass. The report on the survey is dated December 2, 1889; a channel, 7,000 feet long, 6 feet deep at mean low water, 100 feet wide to near the wharves at Wey

outh Landing, 80 feet wide thence to Braintree Bridge, and 50 et wide above that bridge, was estimated to cost $40,000 (Annual eport of the Chief of Engineers for 1890, p. 522). Appropriations ere made under the project as follows:

September 19, 1890, $10,000; July 13, 1892, $10,000; August 17, 1894, $5,000, of hich half must be spent on Weymouth Back River; June 3, 1896, $15,000, of which 0,000 must be spent on Weymouth Back River.

By June 30, 1897, the project was completed above Braintree ridge, and for a width of 60 feet for the rest of the way to Quincy oint, except for four ledges uncovered by the dredging.

River and harbor act approved March 3, 1899, $10,000. This ppropriation completed the dredging of a channel 6 feet deep and 00 feet wide for 3,325 feet, 60 feet wide for 1,650 feet farther, and f the full projected width for the remaining 1,625 feet. Shoaling the parts first dredged had locally reduced depths to 4 feet.

River and harbor act approved June 13, 1902, $5,250. This act ontained also a provision for a preliminary examination and survey f Weymouth Fore River, Mass.; the report on the survey states hat:

The purpose of the survey provided for by the act of 1902 is to ascertain the cost of he improvement of the deeper part of the river extending from its mouth in Hingham Bay (referring to Coast Survey Chart No. 246), about 3 miles in length up to Weymouth Fore River Bridge, about 1,000 feet above its confluence with Town River, and that he Weymouth Fore River is, in my opinion, worthy of improvement up to the Weymouth Fore River Bridge.

The estimated cost was $57,500. (Annual Report of the Chief of Engineers for 1904, pp. 896–897.) The river and harbor act of March , 1905, appropriated the full amount of the estimate with the proviso:

That no part of this sum shall be expended until the Secretary of War shall have eceived satisfactory assurance that the improvement of that portion of the Weymouth River which lies above the improvement herein mentioned, and of the Town River, xcept so much as is herein provided for, shall hereafter be maintained by the State of Massachusetts, or other agency, without expense to the Government of the United States.

By a resolution of the legislature, approved by the governor May 26, 1905, this assurance was given by the Commonwealth of Massachusetts and accepted by the Secretary of War June 7, 1905. (Annual Report of the Chief of Engineers for 1905, pp. 63–64.) The channel above the bridge was completed to full width and depth with the sum appropriated June 13, 1902, and the balance of prior appropriations, and turned over to the State of Massachusetts for maintenance. (Annual Report of the Chief of Engineers for 1906, p. 61.)

In the Annual Report of the Chief of Engineers for 1907, page 63, t is reported that the amount expended on this project (Fore River below Quincy Bridge) to June 30, 1907, not including outstanding liabilities, is $51,486.90, all for improvement, with which the channel has been dredged to the dimensions authorized by the project.

The river and harbor act of June 25, 1910, contained an item for the preliminary examination and survey of Weymouth Fore River, below the Quincy Point Bridge, with a view to straightening and improving the channel. The report dated January 24, 1911, on the survey was favorable; the estimated cost was $140,000. The recommendation was made that the whole sum should be provided in a single appropriation. The river and harbor act approved February

27, 1911, appropriated $140,000 for the project. By June 30, 1913, the entire project will be completed. The building by the State of Massachusetts of a large solid-filled pier on the Commonwealth Flats, South Boston, called for a quantity of gravel filling. As one of the bidders thought the material taken from Weymouth Fore River could be sold for this use, a very low price was secured for the dredging, and an unexpended balance of about $60,000 will remain after final payments have been made.

3. *Navigable extent.*—Weymouth Fore River is a tidal estuary tributary to Hingham Bay on the south side of Boston Harbor. From Quincy Point Bridge to deep water in Hingham Bay, a distance of 3½ miles, there is now a channel 300 feet wide and 18 feet deep at mean low water. Hingham Bay connects with Nantasket Roads and the Atlantic Ocean by a deep and somewhat narrow channel, known as Nantasket Gut, with swift currents between Peddocks Island and Windmill Point on Nantasket Head at the strength of the tide, and by a deep and broader channel to the southwestward of Peddocks Island, with gentle currents. This channel was resurveyed in 1912 by the Coast and Geodetic Survey for the use of the large vessels now building at the Fore River Shipbuilding Co.'s works.

4. *Maximum draft that now can be carried at mean low water.*—From Quincy Point Bridge 18 feet at mean low water is now available for navigation throughout the 300-foot channel to Hingham Bay and thence to the Atlantic Ocean, but the main use of the navigable channel in the river is for the large vessels built and repaired at the Fore River works. They use every inch of water available at high tide and wait for spring tides before bringing the largest vessels up or down the river; 27 feet has thus been carried over the stream without touching bottom and is the depth now really available for the class of navigation dependent on the channel.

5. *Rise and fall of water surface.*—The range of tide at the mouth of Weymouth Fore River is closely that at Boston Light. No continuous observations have been made at the upper end of the improved river with sufficient regularity to afford a reliable basis for a mean range. At Boston Light the range of spring tides is 10.3 feet, of neap tides is 7.6 feet, and of mean tides is 9.5 feet.

6. *Headroom and clear span of bridges.*—In the part of the river improved under the project of March 3, 1905, there are no bridges. Between the upper limit of that improvement and the Fore River works is a drawbridge, which at a cost of nearly $50,000 has just been modified to provide two openings 125 feet in the clear. The clear headroom below the lower chords is 17 feet at mean low tide.

7. *Unusual difficulties of navigation.*—The difficulty of handling vessels 600 feet long and drawing 27 feet of water in a 300-foot channel whose depth exceeds the draft by only a few inches is unusual and self-evident. The Fore River works were erected in 1900, and since that date the size of war vessels of the class they construct has increased from the *Rhode Island* class, about 15,000 tons displacement (435-foot length, 76-foot beam, 24-foot draft, loaded), to that of the *Rivadavia*, now nearly completed, 27,566 tons (588 feet long, 98-foot beam, 30-foot draft, loaded). The unusual difficulties of navigation are mainly due to the increase in the length and beam of such vessels, but their loaded draft also is growing greater.

8. (a) *Terminals.*—On the left bank of the river and just below the ridge is a granite quay wall, carrying a coal pocket for local coal distribution. It is provided with good mechanical facilities for unloading barges. There is also a concrete quay wall carrying the Old Colony Railroad power plant, and an adjacent pile wharf with good mechanical facilities for handling from barges the coal used by the power plant. I am informed that the town of Quincy proposes the construction of a municipal pier, to which access will be afforded all water carriers on equal terms, but no such pier has as yet been built. There is no physical connection between the above wharves and any steam railroad, and there is no contract for interchange of traffic by prorating as to such long-distance traffic as may be desired to be carried partly by rail and partly by water to its destination. Both wharves are served by adequate highways. Above the bridge, but lying within the part of the river which the interested parties would like to have the United States now improve, lie the works of the Fore River Shipbuilding Co. They have two small mooring slips, dredged to 15 feet at mean low water, and one large mooring slip, 30 feet deep at mean low water, 200 feet wide, 840 feet long, with a solid quay wall on the southern side. This quay wall supports a powerful gantry crane capable of handling naval turrets, heavy guns, and the like. Railroad tracks of the New York, New Haven & Hartford Railroad connect directly with local tracks in the yard and on the quays. The whole constitutes an efficient and powerful terminal for exchange of traffic between rail and water. It is used exclusively in connection with the building and equipping of large vessels. There is also an exceptionally large launching ways and shipbuilding shed capable of simultaneous use by two vessels each over 600 feet long. There is also a powerful marine railway. The terminal facilities are not open to all water carriers on equal terms, but are for the exclusive use of the shipbuilding company. Excellent physical connection exists between this modern water terminal and the railroads serving the adjacent territory. No contract for interchange of traffic by prorating as to such long-distance traffic as may be desired to be carried partly by rail and partly by water to its destination is known to exist, and no such contract is probable, as the whole use of the plant is for the building and launching of ships and their repair. Fine highways connect with the plant.

(b) *Water power, cooperation, etc.*—No questions of water power, floods, or land reclamation are involved. Cooperation on the part of the State or of local riparian owners may well be required for the part of the river above the bridge, where the interested parties desire the removal of a small yardage to permit large vessels to use the east draw span. Up to the time of the recent widening of draw openings the west opening was the only one available for large vessels. In this connection attention is invited to the following extracts from a letter dated April 15, 1913, received from the president of the Fore River Shipbuilding Co.

> * * * The new drawbridge has been completed * * * making two openings in the draw, each 125 feet in width, this company bearing one half the expense and the towns and counties adjoining the other half. The amount assessed against us and paid by us was $24,600.

The provision of this increased width of draw opening, without the intervention of the United States, has thus cost the State and towns

$24,600 and the Fore River works a like sum. This is of direct and immediate benefit to the navigation for which the new project is asked; it may properly be taken as a very considerable contribution on the part of the local owners and authorities toward the desired improvement. Returning to the dredging above the bridge the above letter states:

* * * It does materially affect the use of the bridge, on which we have incurred such a large expense, and the channel which the Government has improved, with the full knowledge that its principal use at the present time for large vessels was for those coming to and from our works. If the expenditure here involved is one that does not come within the authority of your appropriation, we are willing to contribute the sum of $1,000 for this purpose, which we understand will be sufficient to cover the cost of the work, if it can be included in your general contract. In making this offer, we beg to remind you that we have already dredged in excess of a million yards above the bridge, and this, taken together with our contribution of $24,600 toward the construction of the new drawbridge, makes it evident that we have certainly contributed our full share to this improvement.

Large payments have therefore been made by this corporation in the past for work directly benefiting the navigation of the river below their works and above the bridge. Their doing $1,000 worth of dredging at and above this bridge to make the east draw opening safely available would constitute a direct contribution toward the object sought by the new improvements. The State has assumed the maintenance of the channel above the bridge, and with the towns and counties has paid $24,600 for wider draw openings. It seems that sufficient cooperation has been given in the past and is now offered for the future to justify the United States in giving very careful study and consideration to the plan suggested by the interested parties and discussed later in this report.

(c) No other subjects appear to be so closely connected with the suggested modifications in the existing project for Weymouth Fore River as to make their discussion germane to the questions under consideration.

9. *References to examination or survey reports and maps or plans not in project documents.*—

Section covered.	Congressional documents.				Annual Reports of Chief of Engineers.	
	House or Senate.	No.	Congress.	Session.	Year.	Page.
Weymouth Fore River above Fore River Bridge, 1889.[1]	House...	Ex. 26 [2].	51st.....	1st.....	[3] 1890	521
Weymouth Fore River below Fore River Bridge, 1902–3.[4]	...do.....	Ex. 36 [2].	58th.....	2d.....	[3] 1904	891
Weymouth Fore River below Fore River Bridge, 1910.[5]	...do.....	1334 [3]....	61st.....	3d.....	.....	.....

[1] Original project, Sept. 19, 1890.
[2] Contains maps.
[3] No maps.
[4] Project of Mar. 3, 1905.
[5] Existing project, Feb. 27, 1911.

10. *Worthy or not worthy.*—The United States has a direct interest in this improvement, as it affords its naval vessels access to the works of the Fore River Shipbuilding Co., where already four of its largest armored vessels have been built and delivered. The *New Jersey* and *Rhode Island* were built there in 1901–1906, the *Vermont* in 1903–1907, the *North Dakota* in 1907–1910, and the *Nevada* is now

under contract, with delivery expected in 1915. Four lightships and eight Army tugs have been built there also for the United States. The following extract from a letter from the Secretary of the Navy to the Secretary of War, dated December 13, 1910, recognizes the existence of this national interest in the improvement of Weymouth Fore River:

* * * This is of consequence to the Navy for the reason that the Fore River Shipbuilding Co. from time to time constructs battleships for the Government, and these are liable to be, in the near future, of 30,000 tons displacement. If, therefore, there is not sufficient water in the river, we shall lose one of our bidders, and one of the Navy's resources in the way of shipbuilding. (See House Doc. No. 1334, 61st Cong., 3d sess., p. 10.)

By the appropriation in the act of February 27, 1911, Congress has acquiesced in the estimate of the War Department that the improvement (widening and straightening solely) contemplated by the project submitted under the act of June 25, 1910, was worth $140,000 to the National Government. Due to the opportune demand by the Commonwealth of Massachusetts for a large quantity of suitable filling material for its new pier at South Boston, at the exact time the dredging contract was let by the United States, a price but little more than half the usual dredging price in this vicinity was secured, and a balance of about $60,000 is therefore unexpended from the appropriation. It does not seem illogical to take this balance as a criterion, and I report that in my opinion the river below the Quincy Point Bridge is worthy of such further advantageous widening and straightening as can be provided by the United States for about $60,000.

11. *Interested parties.*—Efforts have been made to get into touch with all parties who have real interests in the proposed improvements of Weymouth Fore River. Under date of April 15, 1913, a letter was received, signed by the mayor of Quincy, the president of the Quincy Board of Trade, the Commissioner of Navigation, Water Fronts and Waterways, of Quincy, the president of the Bay State Street Railway Co. (electric), the president of the New England Coal & Coke Co. (which ships some coal up Weymouth Fore River), J. F. Sheppard & Sons (Inc.), Cyrus Patch & Son (Inc.), and the vice president of the Boston Tow Boat Co. The letter inclosed a blue print, and reads as follows:

We have examined the modification of the project of the Weymouth Fore River, as shown on the accompanying plan dated April 11, 1913. We believe it is necessary for the safe navigation of the vessels using this river and respectfully urge its favorable consideration.

The blue print was identical with that accompanying a letter of the same date from the Fore River Shipbuilding Co., from which the following extracts are taken:

We duly received your favor of March 18, with reference to the examination of the Weymouth Fore River and have given the matter careful consideration as the result of our experience.

We respectfully submit plans herewith, in duplicate, showing the improvements in the channel which are necessary for safe navigation of the vessels using it and which, in our judgment, constitute the improvements most desirable for present uses. * * *

The present project presented to you herewith includes, at first, the widening of the channel just below the bridge. * * * With large vessels coming downstream, it is important to use the easterly side of the draw, as it gives more room for the stern to swing in making the short turn below the draw. Below this point, the changes which we suggest are in the direction of widening the channel to 400 feet and the

straightening of it for safe navigation by the dredging of the hatched portions on the westerly side. This will make a channel of straight reaches easily and simply marked, and is correspondingly certain in use. In the northerly part of the channel we have plotted the recent survey of the Coast Survey.

We beg your indulgence to the return for a moment to the importance of the use of the easterly side of the draw and for large vessels coming to the shipyard and approaching our pier, for which the easterly side of the draw is equally important and advantageous as it is in going down the river. While there is natural deep water opposite our works, in order to utilize the easterly side of the draw to the same depth as the channel below the bridge and as to the natural depth above it is necessary that some dredging should be done, as indicated on a second sketch [dated March 28, 1913], submitted herewith, quite small in amount, but essential to the purpose indicated. The depths are such that the dredging required does not affect the original project for the Weymouth Fore River above the bridge, for which the State of Massachusetts has assumed the maintenance, but it does materially affect the use of the bridge, on which we have incurred such a large expense and the channel which the Government has improved, with the full knowledge that its principal use at the present time for large vessels was for those coming to and from our works. If the expenditure here involved is one that does not come within the authority of your appropriation, we are willing to contribute the sum of $1,000 for this purpose, which we understand will be sufficient to cover the cost of the work if it can be included in your general contract. In making this offer we beg to remind you that we have already dredged in excess of a million yards above the bridge, and this, taken together with our contribution of $24,600 toward the construction of the new drawbridge, makes it evident that we have certainly contributed our full share to this improvement.

Under date of April 23, 1913, the same company, in reply to inquiries from this office, gives the following additional information:

* * * We beg to advise that the capitalization of the Fore River Shipbuilding Co. is $4,800,000.

The construction of the present Fore River plant was started in 1900, in which year we excavated on the water front of the plant in excess of 300,000 yards of material. We have continued improvements on the water front from time to time and to-day the amount excavated has been in excess of 1,000,000 yards.

The dimensions and displacements of the battleships recently built or building at this plant are as follows:

	Trial displacement.	Maximum displacement.	Length.	Beam.	Draft when taken from Fore River yard.	Maximum draft.
	Tons.	*Tons.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
North Dakota	20,000	22,000	510	84.10	26	29.4
Rivadavia	27,566	29,000	585	98	27	30
Nevada	27,500	28,400	575	95	27	29.6

The total annual pay roll is $2,750,000.

The plan submitted by the Fore River Shipbuilding Co. is limited to widening and straightening, carrying somewhat further the similar improvements undertaken by the United States under the project appropriated for on February 27, 1911, under which dredging was completed on September 23, 1912; from present indications the removal of Channel Rock will be completed before June 30, 1913.

12. *Commerce.*—The following commercial statistics have been collected by this office:

Commercial statistics.

Articles.	1908	1909	1910	1911
	Short tons.	*Short tons.*	*Short tons.*	*Short tons.*
Coal	155,373	135,765	149,596	145,162
Lumber	11,102	10,909	27,157	11,460
Brick	561	272	697	245
Sand and gravel	547	1,442	980	786
Ties	.....	4,527	.....	3,194
Stone	4,596	5,900	6,473	9,620
Hay	45	.....	.....	.....
Steel and iron	1,310	.....	130	40
Boilers	.....	.....	150	.....
Machinery	.....	.....	1,000	.....
Lath	.....	.....	.....	528
Shingles	.....	.....	.....	673
Manufactured articles	.....	.....	.....	1,712
Miscellaneous	115	527	120	25
Total	173,649	159,342	186,303	173,445

Vessel classification, 1912.

Class.	American.	Foreign.	Total.	Total net registered tonnage.
Registered:				
Steamers	145	.....	145	61,586
Sailing vessels	70	5	75	46,478
Barges and lighters	42	.....	42	35,300
Miscellaneous	2	.....	2	250
Unregistered:				
Steamers	4	.....	4	.....
Sailing vessels	20	.....	20	.....
Unrigged	10	.....	10	.....
Total	293	5	298	143,614

Freight traffic.

Articles.	Amount (customary units).	Short tons.	Valuation.
Coal	148,896 short tons	148,896	$597,302.45
Lumber	6,673,963 feet 2,000 short tons	12,082	191,630.21
Brick	225,400 (number)	451	1,359.00
Shingles	3,383,500 (number)	363	12,013.50
Laths	1,938,800 (number)	484	7,618.00
Sand	520 short tons	520	1,920.00
Boilers	500 short tons	500	80,000.00
Turbines	350 short tons	350	350,000.00
Ties	34,934 (number)	2,620	20,960.00
Stone	3,500 short tons	3,500	7,000.00
Miscellaneous	500 short tons	500	11,250.00
Total	.....	170,266	1,281,053.16

The commercial statistics given above include receipts and shipments for Town River, on which the water-borne freight during 1912 was 13,856 tons, valued at $110,834.71.

13. *Survey.*—For the work desired below the bridge the quantities of excavation can be accurately determined from maps now on file in this office. For the part above the bridge no survey is needed if the views expressed in the first part of paragraph 8 (b) are adopted and all work above and under the bridge be paid for by the State or by those locally interested. It is therefore recommended that I be authorized from data now on hand to prepare and submit plans and estimates of cost, not exceeding $60,000, of

such widening and straightening of the channel of Weymouth Fore River between Quincy Point Bridge and deep water in Hingham Bay as may appear necessary for present and prospective navigation.

FREDERIC V. ABBOT,
Colonel, Corps of Engineers.

[First indorsement.]

OFFICE OF DIVISION ENGINEER, NORTHEAST DIVISION,
New York, May 3, 1913.

To the Chief of Engineers, concurring in the recommendations of the district engineer officer.

W. M. BLACK,
Colonel, Corps of Engineers.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
July 16, 1913.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. This is a report on preliminary examination of Weymouth Fore River, Mass., with a view to a modification of the project. The district officer recommends that he be authorized to submit plans and estimates for further widening and straightening the channel below the Quincy Point Bridge to an extent not exceeding $60,000.

2. Not being fully convinced that additional improvement was advisable, the board requested that interested parties be so informed and invited to submit their views on the subject. This resulted in a hearing at the office of the board on July 15, 1913, which was attended by several Members of Congress, the president of the Fore River Shipbuilding Corporation, and the local harbor commissioner.

3. From the information now before the board it appears that additional depth as well as width is desired and that some increase in channel dimensions may be justified if obtainable within reasonable limits of cost. To determine this question it is recommended that the district officer be authorized to make such further survey and investigation as may be necessary to determine the cost of obtaining a depth of 24 feet, and also of any lesser depth that may be deemed economically advisable, with a width of channel in straight reaches of 400 feet, suitably widened at the bends.

For the board:

LANSING H. BEACH,
Colonel, Corps of Engineers,
Senior Member Present.

SURVEY OF WEYMOUTH FORE RIVER, MASS.

UNITED STATES ENGINEER OFFICE,
Boston, Mass., January 26, 1914.

From: The District Engineer Officer.
To: The Chief of Engineers, United States Army
(Through the Division Engineer).
Subject: Survey of Weymouth Fore River, Mass.

1. In compliance with instructions in your letter dated July 24, 1913, the following report is submitted on the survey of Weymouth Fore River, Mass., with a view to a modification of the project.

2. The following extract from the indorsement of the Board of Engineers for Rivers and Harbors of July 16, 1913, explains the specific object of the survey and estimates that form the subject of this report:

3. From the information now before the board, it appears that additional depth as well as width is desired, and that some increase in channel dimensions may be justified if obtainable within reasonable limits of cost. To determine this question, it is recommended that the district officer be authorized to make such further survey and investigation as may be necessary to determine the cost of obtaining a depth of 24 feet and also of any lesser depth that may be deemed economically advisable, with a width of channel in straight reaches of 400 feet, suitably widened at the bends.

3. The present channel from Nantasket Roads in Boston Harbor passing west and south of Peddocks Island has a width of at least 500 feet and depth of 24 feet at mean low water to a point northwesterly from Grape Island, with the one exception that a small shoal south of the west end of Peddocks Island contracts the available width to about 375 feet at that point. For the remaining distance of 2¾ miles up to the Quincy Point Bridge the channel is 18 feet deep at mean low water and at least 300 feet wide. Through the west draw passage of the bridge and up to the piers of the Fore River Ship Building Co. there is an available depth of at least 18 feet at mean low water.

4. On the accompanying map a channel 400 feet wide is shown, extending from the end of the natural 24-foot channel up to Quincy Point Bridge, and consisting of two straight reaches joined by a curve with a least radius of 3,000 feet on which the width is increased to at least 450 feet. In the vicinity of Quincy Point Bridge a portion of the turning basin which has been dredged 18 feet deep by the United States under project approved February 27, 1911, has been included in the present lines, and on the easterly side just below the bridge the high bank is cut off to facilitate the approach around the point to the easterly draw of the bridge. Dredging into this bank and to the easterly draw, as shown on the map, can not be done without encroachment on the land above high-water lines, and the probable destruction of a small pile wharf and stone pier at this point. Any appropriation for work which will make this necessary should contain a proviso that the money shall be applied to work at this point only when the State or local authorities shall have provided valid releases to the wharf and stone pier and such area of the upland as may be necessary free of cost to, or claims of damages against, the United States. The removal of the small shoal in the outer part of the channel south of the west end of Peddocks Island should also be included in the improvement. The channel defined by heavy lines on the map conforms as nearly as practicable to the requirements for safe and convenient handling of vessels of the large dimensions built at the works of the Fore River Shipbuilding Co.

5. Within the channel lines shown on the map ledge rock is known to exist at Channel Rock only, near the junction of the two straight reaches of channel about 1¼ miles below Quincy Point Bridge. The original least depth of water on this rock was 7.3 feet, which has been increased to 18 feet at mean low water by its removal by the United States under project approved February 27, 1911. Borings indicate that this rock is an isolated peak of ledge down to a depth of 24 feet below mean low water, and its position is such as to render its removal necessary to whatever depth may be adopted for further improvement of the channel. It is believed that all other material

to be removed in further improvement will be mud, sand, gravel, clay, and bowlders.

6. Estimates have been made of the cost of the channel up to Quincy Point Bridge, shown on the map to several depths, as follows:

Estimate of cost of channel 24 feet deep at mean low water.

Dredging 1,292,090 cubic yards (scow measurement), at 22 cents	$284,259.80
Ledge, 9,609 cubic yards (place measurement), at $11	105,699.00
	389,958.80

The work should be completed in two years and should be provided for by a single appropriation.

Estimate of cost of channel 22 feet deep at mean low water.

Dredging 784,269 cubic yards (scow measurement), at 24 cents	$188,224.56
Ledge, 5,924 cubic yards (place measurement), at $13	77,012.00
	265,236.56

The work should be completed in 18 months and should be provided for by a single appropriation.

Estimated cost of channel 21 feet deep at mean low water.

Dredging 566,329 cubic yards (scow measurement), at 25 cents	$141,582.25
Ledge, 4,308 cubic yards (place measurement), at $14	60,312.00
	201,894.25

The work should be completed in 18 months and should be provided for by a single appropriation.

Estimated cost of channel 20 feet deep at mean low water.

Dredging 395,244 cubic yards (scow measurement), at 27½ cents	$108,692.10
Ledge, 2,840 cubic yards (place measurement), at $16	45,440.00
	154,132.10

The work should be completed in one year and should be provided for by a single appropriation.

Estimated cost of widening the existing channel 18 feet deep at mean low water to the lines shown on the map.

Dredging 75,945 cubic yards (scow measurement), at 27½ cents	$20,884.87

All the above estimates include allowance for engineering and contingencies. The cost of maintenance of any of the above work it is believed will be so little as to be negligible.

7. No estimates have been made for work above Quincy Point bridge. The bridge has been recognized in two former projects as the head of improvement by the United States. Roughly and without definite estimates, a channel 400 feet wide 24 feet deep above bridge to first pier of Fore River Shipbuilding Co. will cost $25,000 to $30,000, reducing rapidly for lesser depths.

8. The existing channel with depth of 18 feet at mean low water has depths of 25.6 feet, 27.5 feet, and 28.3 feet at neap, mean, and spring high waters, respectively.

9. The freight carried on the river in 1912 was 170,266 short tons, valued at $1,281,053.16, of which the greater part is coal (from Annual Report 1913, page 95), and existing channel depths are sufficient for this traffic.

10. The increased depth desired is of importance at present exclusively to the Fore River Shipbuilding Corporation, located a short distance above the Quincy Point bridge.

11. There is an available balance of about $60,000, the expenditure of which has been authorized by Congress on former project but it is not yet spent. This will cover cost of widening present channel to limit of 400 feet at present depth of 18 feet.

12. While the purpose of the survey appears to have been primarily to obtain the additional information required by the Board of Engineers as stated in the above extract from their indorsement of July 16, the instructions of the Chief of Engineers to this office of July 24 are in the usual form, calling for an expression of opinion from the district officer as to the extent of improvement justified by the commercial and other interests involved.

13. The question admits of consideration and treatment from many viewpoints, and it could be made the text for quite an extended discussion. As I look at it, however, it seems comparatively simple so far as my duties in the matter are concerned. There are no general commercial interests of consequence involved, other than those of the Fore River Shipbuilding Corporation. The outside interests are amply served by the existing channel, and the indications are that this channel will be sufficient for these interests for an indefinite period in the future; therefore as regards them the proposed improvement would not in my opinion be justified.

14. The commercial interests of the Fore River Shipbuilding Corporation are very large and important. The extent to which the proposed improvement would be justified to meet the present and prospective requirements of this corporation can only be determined by those charged with the management of its affairs. Assuming that some degree of improvement of the channel is justified by the needs of the Fore River Shipbuilding Corporation, the question would be whether assistance in this form should be extended to this corporation by the Federal Government. This can only be determined by those whose activities frame and establish the policies of the Nation in this respect, and those upon whom devolves the duty of putting such policies into effect after they have been adopted. An opinion from me on this question would certainly not be appropriate or of value.

JOHN MILLIS,
Colonel, Corps of Engineers.

[First indorsement.]

THE DIVISION ENGINEER, NORTHEAST DIVISION,
New York City, January 30, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY.

1. Forwarded.

2. The estimates contained in paragraph 6 indicate that to obtain an increase in depth from 18 feet to 20 feet would cost about $95,000 more than the balance unexpended from former appropriations, but that widening the existing channel to 18 feet at mean low water to the lines shown on the map would cost only about $21,000—about $39,000 less than the unexpended balance.

3. The question of worthiness or unworthiness of this work was discussed quite fully in paragraph 10 of the preliminary examination report which I submitted as district engineer officer on May 1, 1913, and is further discussed by the present district engineer officer in paragraphs 13 and 14 of the within report.

4. The case is quite different from the usual one and the propriety of an appropriation must be determined by those whose activities frame and establish the policies of the Nation. In my preliminary report my recommendation was based on this same idea, for I stated:

It does not seem illogical to take this balance as a criterion, and I report that, in my opinion, the river below the Quincy Point Bridge is worthy of such further advantageous widening and straightening as can be provided by the United States for about $60,000.

5. Taking all the facts into consideration I recommend the widening of the existing channel 18 feet deep at mean low water to the lines shown on the map for the sum of $21,000, approximately, provided such appropriation of a portion of the unexpended balance be approved by Congress as accordant with the policy as outlined in the original appropriation for Weymouth Fore River contained in the river and harbor act of February 27, 1911.

FREDERIC V. ABBOT,
Colonel, Corps of Engineers.

[For Report of the Board of Engineers for Rivers and Harbors on survey, see p. 3.]

LETTER OF FORE RIVER SHIPBUILDING CORPORATION.

QUINCY, MASS., *April 15, 1913.*

DEAR SIR: We duly received your favor of March 18, with reference to the examination of the Weymouth Fore River and have given the matter careful consideration as the result of our experience.

We respectfully submit plans [1] herewith, in duplicate, showing the improvements in the channel which are necessary for safe navigation of the vessels using it and which, in our judgment, constitute the improvements most desirable for present uses.

The use of the channel during the last two years has led us to modify somewhat the suggestions made to you in our letter of April 14, 1911. Since that time the new drawbridge has been completed and the fender piers, together with the permanent piers of the bridge, making two openings in the draw, each 125 feet in width, this company bearing one-half the expense and the towns and counties adjoining the other half. The amount assessed against us and paid by us was $24,600. The present project presented to you herewith includes at first the widening of the channel just below the bridge, which we pointed out at that time was necessary to enable the use of the easterly side of the draw. With large vessels coming downstream, it is important to use the easterly side of the draw as it gives more room for the stern to swing in making the short turn below the draw. Below this point, the changes which we suggest are in the direction of widening the channel to 400 feet and the straightening of it for safe navigation by the dredging of the hatched portions on the westerly side. This will make a channel of straight reaches easily and simply marked and is correspondingly certain in use. In the northerly part of the channel we have plotted the recent survey of the Coast Survey.

We beg your indulgence to the return for a moment to the importance of the use of the easterly side of the draw and for large vessels coming to the shipyard and approaching our pier, for which the easterly side of the draw is equally important and advantageous as it is in going down the river. While there is natural deep water opposite our works, in order to utilize the easterly side of the draw to the same depth as the channel below the bridge and as to the natural depths above, it is necessary that some dredging should be done, as indicated on a second sketch submitted here-

[1] Not printed.

with, quite small in amount, but essential to the purpose indicated. The depths are such that the dredging required does not affect the original project for the Weymouth Fore River above the bridge, for which the State of Massachusetts has assumed the maintenance, but it does materially affect the use of the bridge, on which we have incurred such a large expense, and the channel which the Government has improved, with the full knowledge that its principal use at the present time for large vessels was for those coming to and from our works. If the expenditure here involved is one that does not come within the authority of your appropriation, we are willing to contribute the sum of $1,000 for this purpose, which we understand will be sufficient to cover the cost of the work if it can be included in your general contract. In making this offer, we beg to remind you that we have already dredged in excess of a million yards above the bridge and this, taken together with our contribution of $24,600 toward the construction of the new drawbridge, makes it evident that we have certainly contributed our full share to this improvement.

Very respectfully,

FORE RIVER SHIPBUILDING CO.
By F. T. BOWLES, *President.*

Col. F. V. ABBOT, *Corps of Engineers.*

[Letter of the Fore River Shipbuilding Corporation.]

FORE RIVER SHIPBUILDING CORPORATION,
Quincy, Mass., July 3, 1913.

GENTLEMEN: Having received a copy of your public notice dated June 11, 1913, with reference to the provision of the river and harbor act approved March 4, 1913, for a preliminary examination of the Weymouth Fore River, Mass., with a view to a modification of the project, we have the honor to submit the following statement, conforming ourselves as nearly as practicable to the provisions of your notice. We are addressing ourselves to the dredged channel of the Weymouth Fore River below the Quincy Point Bridge and are appending to this letter copy of our letter of April 15, with inclosed plans, submitted to the district engineer on this subject.

1. *The number and size of vessels now using the channel:*

The commerce of the river for the years subsequent to 1909, shown in Document 1334 (61st Cong., 3d sess.), is as follows:

Articles.	1910	1911	1912
	Short tons.	*Short tons.*	*Short tons.*
Coal	149,596	145,162	148,896
Lumber	27,157	11,460	12,082
Brick	697	245	451
Sand and gravel	980	786	520
Ties	.....	3,194	2,620
Stone	6,473	9,620	3,500
Steel and iron	130	40	.....
Miscellaneous and manufacturing material	120	1,737	500
Boilers	150	.....	500
Machinery	1,000	.....	.....
Laths	.....	528	484
Shingles	.....	673	363
Turbines	.....	.....	350
Total	186,303	173,445	170,266

The vessels which came to our works for repairs and other purposes are not included in this statement, and during the past year numbered eight, of a total displacement tonnage of 18,000.

2. *Any increase that may be expected.*—During the current year there will leave our works the tank steamer *Richmond*, 436 by 54 feet by 31 feet 6 inches; battleship *Rivadavia*, 585 by 98 by 42 feet, and draft of 27 feet 6 inches; the steamer *Almoco*, 329 by 46 feet by 25 feet 6 inches draft; United States battleship *Nevada*, 583 by 94 feet 10 inches by 27 feet 6 inches draft. We are at present making tenders on a fleet of steamers 518 feet in length, 66 feet beam, 30 feet 8 inches draft, and also on another lot of steamers, 490 by 62 feet 6 inches by 30 feet draft.

The plan for the development of the shipyard include a graving dock, 650 feet in length, for which we have a desirable site on our own property with ledge foundation. A dry dock of the dimensions proposed would be capable of docking all vessels in the

regular service to the port of Boston, and we are desirous of proceeding with the construction of this dock if the channel to our works were made such as to provide suitable, convenient, and safe navigation for vessels running to Boston. The largest vessels in present service to Boston are the *Cincinnati* and *Cleveland*, the *Cincinnati* being 582.3 by 65.4 feet, with a depth of 46.5 feet, full-load draft of 32.8 feet, and the *Cleveland* being 588.9 by 65.3 feet, with a depth of 46.5 feet. The *Franconia* and *Laconia* are vessels of 600 by 71 feet by 44 feet depth, draft 29 feet 6 inches.

3. *Why the channel to be provided under the existing project, which apparently met with the approval of those in interest two years ago, is not adequate; the difficulties, if any, now actually experienced by navigation.*—The existing project is not adequate in the respect that it does not provide for the use of the easterly side of the drawbridge at Quincy Point. In submitting our opinion as to the desirable improvements in the channel under date of July 19, 1910, we stated, "it is also important to widen the river on the south side in the vicinity of the eastern opening of the draw in order to make this side of the bridge available going downstream." This improvement, which we subsequently called attention to under date of April 14, 1911, with a plan, a copy of which is attached hereto, was not included in the existing project and is a serious cause of inadequacy, especially since the project has been completed and that side of the draw is not available for use.

The existing project is also inadequate in respect that it is not possible to secure safe navigation of the battleships building and designed to-day with a beam of 98 feet in a crooked channel 200 feet wide. At the time of our suggestions for the existing project the largest battleship constructed here was the *North Dakota*, 518 feet 11 inches by 84 feet 10 inches, 44 feet 6 inches depth, with a draft of 26 feet 10¾ inches, 20,000 tons displacement, and that vessel was navigated in portions of the channel not since improved by the use of four tugs and special buoying. We are now building a battleship 50 per cent increased size and 2 feet additional draft, with the prospect of construction of vessels of this type of considerably greater size. While it is true, as stated in your public notice, that the vessels of maximum size are few in number, we respectfully state that it is not possible to secure safe navigation for such vessels with reasonable care, and we feel from experience that it is only by choosing the maximum tide and the best weather conditions and using every possible precaution and assistance that we can secure navigation which even then involves undue risk.

We respectfully request a public hearing.

Very respectfully,

FORE RIVER SHIPBUILDING CORPORATION,
By F. T. BOWLES, *President*.

The BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

LETTER OF COMMISSIONER OF WATER FRONT, WATERWAYS, AND NAVIGATION, ETC., OF CITY OF QUINCY, MASS.

QUINCY, MASS., *July 15, 1913*.

GENTLEMEN: In considering these improvements, I wish to state why they should be done now.

The average rise of the tide in the daytime is 9 feet 6 inches, and in the nighttime 10 feet 10 inches. It is apparent, therefore, that a large vessel of moderate draft must go up in the night, and it is also apparent, and I shall show that in making the turns under the present conditions it is absolutely dependent upon the judgment and skill of the pilot, whether or not he rounds his corners safely. If he should ground the vessel she would in all probability break her back.

Three facts are most prominent—

First. If a vessel of large size and draft comes up to point or buoy No. 1 at the entrance of this channel she must go on—she can not turn around.

Second. Of necessity she must come up in the night, and as vessels have repeatedly scraped bottom in making the turn at point No. 2, it is asking too much of a pilot to have millions of dollars worth of vessel and cargo dependent on his judgment. One mistake on a battleship would cost the Government many times the cost of the improvement asked for.

Third. The size of the vessel of to-day is constantly increasing, and future vessels will be larger still. The *Utah* or *Arkansas*, built six years ago, when loaded down draw 29 to 30 feet of water, and if in need of being repaired at this port and compelled to use the present channel, would have to be lightened before they could go up the river, and then go up in the night.

It is evident that while the river is navigable both day and night for medium-sized vessels, that the size of all the new vessels make it a necessity that these improvements be made now.

I wish to speak in detail very briefly as to each of the points where we have asked for dredging, and will designate them by numbers.

REASONS FOR EACH IMPROVEMENT.

Point No. 1 is just beyond the Pig Rocks Beacon. The need of this dredge is that a vessel coming in at night in a bad time should be able to take her course from the buoy at the north end of this shoal and hold a straight course to the proposed buoy on the north end of the next shoal, or the reverse in coming out.

Point No. 2.—At this shoal vessels have repeatedly scraped in making the turn, and at night or in a hard blow it depends absolutely on the judgment of one man, the pilot, to round this safely.

If this shoal was removed and the proposed buoy placed, as shown in plan, he could round safely and surely and take a straight course to the next buoy.

I claim it is putting too much responsibility on one person, when so small an amount would prevent it.

Point No. 3.—The dredging of this section, as shown in the plan, takes advantage of all the deep holes and makes a straight course available at the least possible expense.

The moving of the present buoy inshore 50 feet would allow a vessel to take a straight course to the buoy off Germantown Point opposite the Quincy Point Drawbridge and add greatly to the convenience of the channel.

Point No. 4.—At this point the shore rounds out into the channel, making the tide curve toward the wharves on the Quincy shore on the incoming tide and toward the pier on the outgoing tide.

The large vessels going to or from the yard of the Fore River Shipbuilding Co. are taken in or out at about one to one and a half hours before high water with a good smart tide running at this point.

Near the draw at Sheppard's wharf the water is much more shoal than this blue print would indicate, and with an ingoing tide and a smart easterly wind it is excessively difficult to take a large vessel through the west side of the draw safely. If a vessel got aground at this point, she would stay there.

The easterly side of the draw is the best and most logical side to use, as there is good water above the bridge. The Fore River people offer to pay for the dredging above the bridge, and this improvement would mean improvement for all time.

The city of Quincy respectfully asks that you grant our request and give us this much needed assistance to the navigation and commerce of our city.

Respectfully, yours,

FRANK FESSENDEN CRANE,
Commissioner.

The BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

O

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

LATITUDES AND LONGITUDES

Computed from positions of North Weymouth Church, Tall Spire, and Pig Rock Beacon as given in Appendix No 10, Report of 1894, U.S.C. & G.S.

STATION		LATITUDE			LONGITUDE		
B	Stone Monument marked U.S.E.	42°	15'	39.08"	70°	57'	05.33"
C	"	42	15	16.15	70	57	25.86
E	Drill Hole in Ledge	42	14	59.51	70	56	58.40
G	Stone Monument marked U.S.E.	42	14	53.36	70	57	49.03
H	"	42	14	38.26	70	57	51.31
North Weymouth Church, Tall Spire		42	14	34.38	70	56	44.52
Eastern Neck - Sea Plug		42	15	22.53	70	55	56.66
Grape	Drill Hole in Ledge	42	16	07.57	70	55	28.45
Houghs	Drill Hole in Sea Wall	42	16	28.80	70	57	00.49
Pig Rock Beacon		42	16	44.04	70	56	22.65
Peddocks	Drill Hole in Bowlder	42	17	24.22	70	56	54.20

NOTE

The soundings on this map below Grape Island were made in 1913; above Grape Island they are chiefly from a survey made in 1903, supplemented by soundings taken in 1907, 1909, 1911, 1912 and 1913 in progress of improvement of the river.

Soundings are in feet and tenths and show the depth at mean low water.

The Benchmark is on the left hand outer corner of the lower stone step of the first house on the north side of Washington Street and the west side of a private way leading to the Old Colony Railroad Power House at Quincy Point, and is 20.63 feet above Mean Low Water.

Mean High Water Line (Surveyed by U.S. Engineers) is shown thus ——

- - - - (Taken from various sources) - - - -

Mean Low Water Line is shown thus - - - - - -

0 Ft. Contour is shown thus ——

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